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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,120	04/18/2006	Akio Misaka	071971-0569	7423

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EXAMINER	
ALAM, RASHID A	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,120	MISAKA, AKIO	
	Examiner	Art Unit	
	RASHID ALAM	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04/18/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/18/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-4, 11-14, 16-18, 20, and 21-23, rejected under 35 U.S.C. 102(b) as being anticipated by Misaka (WO 02/091079 with English translation US 2004/0029023).

Regarding claim 1-3, 20, and 21, Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions, the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 5, 15, and 43 of English translation). Misaka also teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation). With respect to the width of the of the phase shifter of the mask enhancer, a change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of

the claimed invention is significant. See In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). MPEP 2144.04[R-1].

Regarding claim 4, Misaka teaches a semi-light-shielding-portion is used as a light-shielding portion constituting a mask pattern (see paragraph 0013 and figure 28 of English translation).

Regarding claims 11-14, Misaka teaches a reduced size projection exposure apparatus is used to have the widths of the first and second structures to be between 0.8 x M x lambda/NA to 0.8 x M x lambda/NA, and the width of the first structure to the second structure is smaller (see paragraphs 0008 to 0019 and 0113).

Regarding claim 16-18, Misaka teaches The mask pattern includes a phase shifter that generates a phase difference of 180 degrees and (150+360 x n) degrees or more and (210+360 x n) degrees or less, where n=an integer, with respect to the exposure light between the phase shifter and a light-transmitting portion in which the mask pattern is not formed on the transparent substrate (see paragraph 0034).

Regarding claim 19, Misaka teaches etching, or trenching, the transparent substrate (see paragraph 0038).

Regarding claims 22 and 23, a method is employed to expose a resist film with obliquely incident light and developing the film (see paragraphs 0039, 0308, and claim 11).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 5-10, and 15, are rejected under 35 U.S.C. 103(a) as being unpatentable over Misaka (WO 02/091079 with English translation US 2004/0029023), as applied to claims 1-4, 11-14, 16-18, and 20-23, in view of Ohsaki (US 6,586,168).

Regarding claims 5, 8, and 10, Misaka teaches as stated above. However, Misaka is silent about a fourth and fifth pattern connected to the mask pattern in a continuous pattern.

Ohsaki teaches a mask pattern used for transferring a very fine circuit pattern onto a photosensitive substrate, with a fourth and fifth pattern in a continuous pattern structure (see figures 15B and 15C). Therefore, it would have been obvious to one skilled in the art at the time of the invention to have a mask pattern with five mask pattern structures connected in a continuous mask pattern by Misaka, because Ohsaka teaches a mask pattern used for transferring a very fine circuit pattern onto a photosensitive substrate, with a fourth and fifth pattern in a continuous pattern structure in order to provide an exposure method, an exposure apparatus and/or a device manufacturing method, by which, when a multiple exposure process is to be performed by using plural mask patterns being different in image contrast, every fine line can be reproduced successfully.

Regarding claims 6, 7, 9, and 15, Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions, the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 5, 15, and 43 of English translation). Misaka also teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation).

5. Claims 19 and 24-29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Misaka (WO 02/091079 with English translation US 2004/0029023) in view of Pierrat (US 5,718,829).

Regarding claims 19, 24, 26-29 Misaka teaches a photomask with a transparent substrate in which mask enhancers are placed in regions and phase shifters are placed in regions surrounded by light shielding portions having transparent portions in between regions, the first region being the bottom part of figure 52:b, the second region being the part of figure 52:b that is right to the bottom part, and the third region being the top part of figure 52:b, and the transparent region is sandwiched between the second and third regions (see abstract and figures 5, 15, and 43 of English translation). Misaka also

teaches a varying width of the phase shifters so that the second pattern region has a smaller phase shifter width than the first pattern region and the width of the transparent portion is larger than the a given dimension as well (see figures 28 and 29 as well as paragraphs 0302, 0113 and 0114 of English translation). With respect to the width of the of the phase shifter of the mask enhancer, a change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). MPEP 2144.04[R-1]. Furthermore, Misaka teaches a mask data generation method in which a simulation is performed to carry out the steps of forming phase shifters on a mask (see paragraphs 0352 to 0369). However, Misaka is silent about the CD adjustment of the edge.

Pierrat teaches a method of fabricating a phase structure, in which the edges and the width of the phase shifter are adjusted and controlled to minimize light leakage according to critical dimensions, or best resolution (see abstract and column 1, lines 30-41 as well as column 2, lines 34-65). Pierrat also teaches etching or trenching the transparent substrate (see abstract and column 2:14-17 and Therefore, it would have been obvious to one skilled in the art at the time of the invention to have a photomask and a method of making a photomask in which the width and the edges of phase shifters are controlled and adjusted according to mask data generated through simulations based on CDs by Misaka, because Pierrat teaches to provide an improved phase shift structure for printing isolated opaque features such as opaque lines and to a

method for forming reticles having such a phase shift structure and to provide an improved phase shift structure which requires less space on a reticle than assist-slot and outrigger types of phase shift structures and which produces a minimum of light leakage.

Regarding claim 25, Misaka teaches a semi-light-shielding-portion is used as a light-shielding portion constituting a mask pattern (see paragraph 0013 and figure 28 of English translation).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASHID ALAM whose telephone number is (571)270-3959. The examiner can normally be reached on Mon.-Fri. 7:30 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795

/RASHID ALAM/
Examiner, Art Unit 1795